

FOSSIL MOLLUSC TYPE SPECIMENS IN THE SOUTH AUSTRALIAN MUSEUM

1. POLYPLACOPHORA

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The South Australian Museum collection of fossil chiton types is the largest in the southern hemisphere. It contains primary type material, and some secondary types, of 63 species and subspecies. A further species is represented only by secondary types. All species are from the Tertiary strata of Victoria, South Australia, Tasmania and New Zealand. Species are listed alphabetically according to the original name of the genus or species.

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Most of the fossil chiton types in the South Australian Museum are due to the work of E. Ashby, mainly in conjunction with B.C. Cotton and W.G. Torr. Other fossil chiton types are the result of the work of Cotton & Godfrey. Since Cotton & Godfrey (1940) little has been published on Australian fossil chitons, and no further types have been added to the collection.

We believe that the South Australian Museum collection of fossil chiton types is the largest in the southern hemisphere and one of the more significant collections in the world. It includes type material for 64 species or subspecies, all of which have been verified by us according to available material and information. The specimens are all individual valves, and are listed as 'complete' when the insertion plates and sutural lamina are present, as 'incomplete' when these are missing or the valve slightly damaged, or as 'fragment' when less than half of the valve is present in one piece.

In the following list, species are arranged alphabetically in families under the original name at the time of description. Changes in familial status have been cross-referenced. The present status of each species is, unless indicated otherwise, according to van Belle (1981), except that the family Afossochitonidae is not recognised following Gowlett-Holmes (1987). The following abbreviations are used in the text: NMV = Museum of Victoria, Melbourne; N.Z. = New Zealand; S.A. = South Australia; SAMA = South Australian Museum, Adelaide; Tas. = Tasmania; Vic. = Victoria.

STRATIGRAPHICAL NOTES

All fossil chiton types in the South Australian Museum come from the Tertiary strata of Victoria, South Australia, Tasmania and New Zealand, ranging from early Miocene to late Pliocene (Tables 1, 2).

During this study it was noticed that there were several inaccuracies and ambiguities in the geological data of the original type descriptions, so it is necessary to make some corrections and clarifications at this stage. According to Johnston (1877), the fossiliferous beds at Table Cape, Tasmania, occur at two small bluffs near the township of Wynyard. The Table Cape Group exposed here includes two formations; the Freestone Cove Sandstone (the 'Crassatella Beds' of Johnston) which grades upwards into the overlying Fossil Bluff Sandstone (Banks 1962). Ashby (1929) proposed the 'Lower Bed' at Table Cape to be the type locality and horizon for *Loricella gigantea* Ashby & Torr, 1901. Quilty (1972) refers to 'chiton plates in the lower six inches' of the Freestone Cove Sandstone and we believe this to be the level from which the Ashby specimens were collected. At that time, the age of the fossil deposits at Table Cape was thought to be Eocene (Johnston 1880, 1885; Pritchard 1896) and was until quite recently believed to be Janjukian (Banks 1962). Later studies (Quilty 1966; Ludbrook 1967a, 1973) have shown these strata to be Longfordian, thus the Janjukian age of the Table Cape chiton types needs further consideration.

The original description of *Lepidopleurus clifdenensis* Ashby, 1929 states that this species is from Clifden at the southern end of the South Island of New Zealand and is Hutchinsonian (basal early Miocene) in age, but no stratigraphical data are supplied. Both B.L. Wood in Suggate *et al.* (1978) and Ludbrook (1967b) indicate that Hutchinsonian strata at Clifden are most likely the Clifden Limestone, and so we believe this to be the formation from which this species was collected.

The fossil locality at Gellibrand River, Victoria, occurs in either the Longfordian-Batesfordian Gellibrand Marl or the underlying Janjukian Longfordian Clifton Formation. Both of these units crop out on the

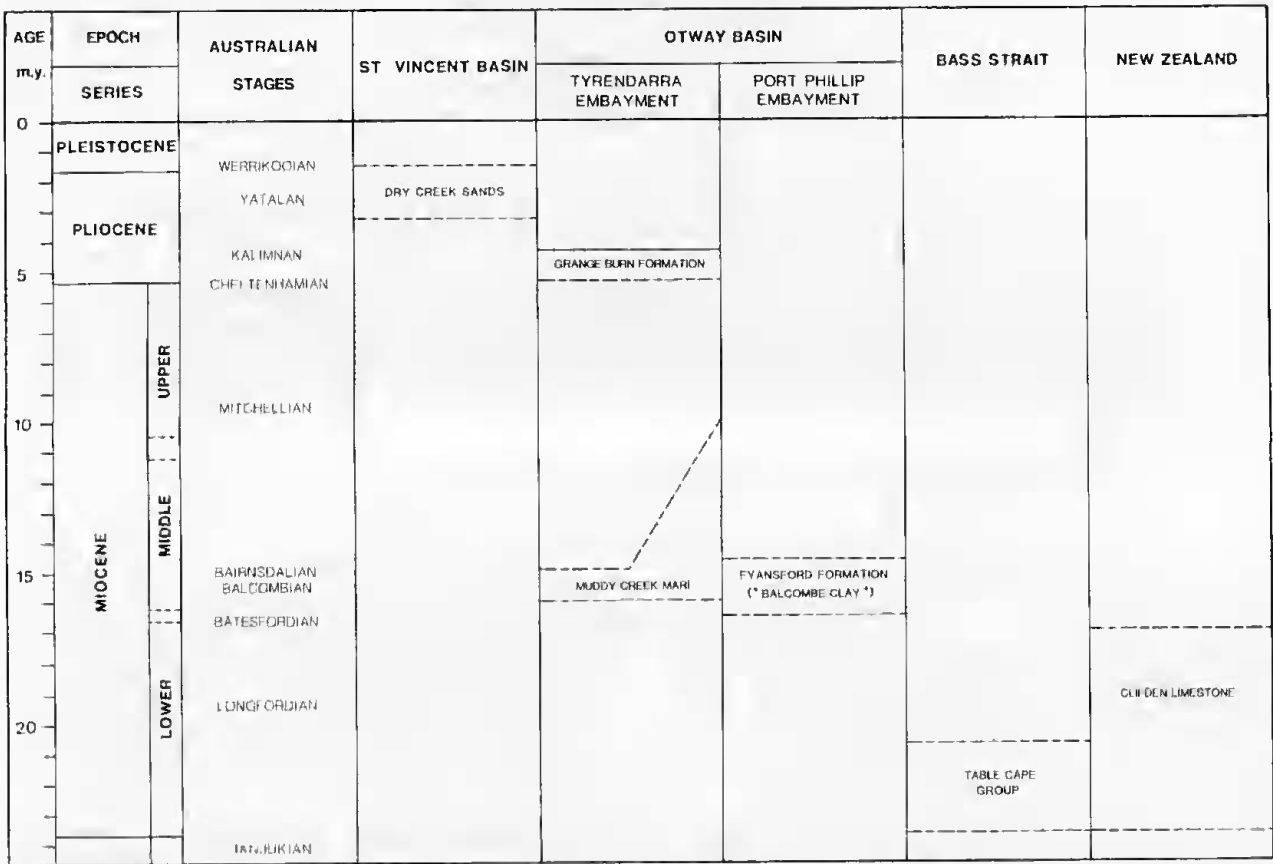


TABLE 1. Generalised correlation chart for the relevant fossil chiton horizons of south-eastern Australia and New Zealand.

ADELAIDE PLAINS DRY CREEK SANDS UPPER PIOCENE	MACDONALDSDALS, FORSYTHS GRANGE BURN FORMATION MIDDLE PIOCENE	CLIFTON BANK MUDDY CREEK MARL MIDDLE MIOCENE	MORNINGTON BALCOMBE CLAY LOWER-MIDDLE MIOCENE	BASS STRAIT TABLE CAPE GROUP LOWER MIOCENE	NEW ZEALAND CLIFDEN LIMESTONE LOWER MIOCENE
<i>Acanthochiton (Eoplax) adelaidae</i> <i>Chiton (Acanthochiton) tricostalis relata</i> <i>Cryptoplax ludbrookae</i>	<i>Acanthochiton drunus</i> <i>A. forsythensis</i> <i>A. (Lirachiton) inexpectus</i> <i>A. singletoni</i> <i>A. trianguloides</i> <i>Acanthochiton (Telochiton) magnicostatus</i> <i>A. sulci</i> <i>Acanthochiton duodeni</i> <i>A. macdonaldensis</i> <i>A. octocostatus</i> <i>Cryptoplax humicus</i> <i>C. sicus</i> <i>Callistochiton greedi</i> <i>C. inexpectus</i> <i>C. reticulatus</i> <i>Callochiton macdonaldi</i> <i>Ischnochiton cossyrus</i> <i>I. durus</i> <i>I. neglectus</i> <i>I. numantius</i> <i>I. tisorus</i> <i>I. vaterian</i> <i>I. vianus</i> <i>Belchiton pulcherrimus</i> <i>Lepidopleurus babidus</i> <i>L. badioides</i> <i>L. sephus</i> <i>L. sinervus</i> <i>L. singus</i> <i>L. uxellus</i> <i>Molachiton naxus</i> <i>Loricella costata</i> <i>L. magnipustulosa</i>	<i>Acanthochiton castus</i> <i>A. pilsbryoides</i> <i>A. sabratius</i> <i>Acanthochiton quadmorei</i> <i>A. (Telochiton) dendus</i> <i>A. (Telochiton) iscus</i> <i>Callistochiton reticulatus</i> <i>Ischnochiton (Rasiella) chitonensis</i> <i>Lepidopleurus badioides</i> <i>L. diversigranosus</i> <i>L. magnogranular</i> <i>L. nivalus</i> <i>L. pamphilius</i> <i>L. relatus</i> <i>Aulacochiton erma</i> <i>Loricella oculata</i> <i>L. varena</i> <i>Oochiton halli</i>	<i>Acanthochites (Notoplax) granulosis</i> <i>A. rostratus</i> <i>Acanthochiton balcombiensis</i> <i>Callochiton (Ocellochiton) sulci</i>	<i>Chiton fessicus</i> <i>C. paucipustulosa</i> <i>Loricella affinis</i> <i>L. compressa</i> <i>Loricella gigantea</i>	<i>Lepidopleurus clifdensis</i>

TABLE 2. Geographic and stratigraphic distribution of SAMA fossil chiton types. Species are listed under their original names, see text for changes and synonyms.

coast of western Victoria approximately 1 km north of the mouth of the Gellibrand River (Abele *et al.* 1976). Although the type specimens of *Plaxiphora concentrica* and *P. gellibrandi* were designated as coming from this locality, subsequent examination of the valves by the authors has led us to believe that the specimens are in fact recent examples of the living species *Plaxiphora (P.) albida*, and not fossil remains at all.

Species described from Mornington, Balcombe Bay and Schnapper Point, Victoria, all come from the early (Batesfordian) to middle (Bairnsdalian) Miocene Balcombe Clay, a unit within the Fyansford Formation which crops out along the eastern coast of Port Phillip Bay, Vic., in the region of Mornington. The two main fossil localities for this formation are Fossil Beach (the type section for the Balcombian Stage) and south of Manyung Rocks. It should be noted that at Schnapper Point the exposed sediments belong to the non-fossiliferous fluvialite Baxter Sandstone of Mitchellian to Cheltenhamian age (Gostin 1966), so it appears that the fossils described from this locality must represent material from either Fossil Beach or south of Manyung Rocks.

The species described from the Hamilton area of Victoria come from the fossil localities at MacDonalds (Bank), Clifton Bank and Forsyths (Bank). The locality at Clifton Bank occurs in the Balcombian–Bairnsdalian Muddy Creek Marl which crops out on Muddy Creek. Disconformably overlying this formation is the Kalimnan (early Pliocene) Grange Burn Formation which occurs on Muddy Creek at MacDonalds (Bank) and on Grange Burn at Forsyths (Bank) (Spencer-Jones 1971). It should be noted that Ashby's locality for Clifton Bank is incorrect, as it is situated on Muddy Creek not Grange Burn.

The species described from South Australia are from Torrensville Bore and Holden's Bore at Woodville, both in western suburbs of Adelaide. All three species come from the late Pliocene (Yatalan) Dry Creek Sands. Where possible, the original type localities have been updated.

Family ACANTHOCHITONIDAE

Genus *Acanthochites* Risso, 1826

Acanthochites (Notoplax) granulosus Ashby & Torr, 1901

Trans. R. Soc. S. Aust. 25(2): 139, pl.4, fig. 9.
= *Protochiton granulosus* (Ashby & Torr, 1901) (PROTOCHITONIDAE).

Syntypes: T844, 1 incomplete median valve, from Schnapper Point, Mornington, Vic., Balcombe Clay, early to middle Miocene (Batesfordian – Bairnsdalian), collector and date of collection unknown. T845, 1 incomplete median valve, same collection data as T844.

Note: See note on Schnapper Point in the Stratigraphical Notes.

Acanthochites rostratus Ashby & Torr, 1901
Trans. R. Soc. S. Aust. 25 (2): 140, pl. 4, fig. 5.
= *Afossochiton rostratus* (Ashby & Torr, 1901).

Holotype: T841, 1 incomplete median valve, from Schnapper Point, Mornington, Vic., Balcombe Clay, early to middle Miocene (Batesfordian – Bairnsdalian), collected by R. Tate and J. Dennant, date of collection unknown.

Note: See note on Schnapper Point in Stratigraphical Notes. Type unique.

Genus *Acanthochiton* Gray, 1821 em. Iredale, 1915.

Acanthochiton (Eoplax) adelaidae Ashby & Cotton, 1936.

Rec. S. Aust. Mus. 5 (4): 510, fig. 2.
= *Notoplax adelaidae* (Ashby & Cotton, 1936).

Holotype: P10159 (ex D12882), 1 incomplete median valve, from 151 m depth, Torrensville Bore, Adelaide, S.A., Dry Creek Sands, late Pliocene (Yatalan), collected by W.J. Kimber, date of collection unknown.
Note: Type unique.

Acanthochiton balcombiensis Ashby, 1939

Proc. Linn. Soc. Lond. 151(3): 188, pl. 3, fig. 4.
= *Acanthochitona balcombiensis* Ashby, 1939.

Holotype: P10160, 1 incomplete median valve, from Balcombe Bay, Mornington, Vic., Balcombe Clay, early to middle Miocene (Batesfordian–Bairnsdalian), collected by F.A. Cudmore, date of collection unknown. Note: Type unique.

Acanthochiton casus Ashby & Cotton, 1939

Rec. S. Aust. Mus. 6(3): 214, pl. 20, fig. 30.
= *Acanthochitona casa* Ashby & Cotton, 1939.

Holotype: P4349, 1 incomplete median valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian–Bairnsdalian), collected by W. Greed, date of collection unknown.

Note: Cotton and Wedding (1941) suggest this species may be a juvenile of *Afossochiton cudmorei* Ashby, 1925, which is followed by van Belle (1981). However, we believe the specimen is adult and represents a distinct species of *Acanthochitona*. Type unique.

Acanthochiton drunus Ashby & Cotton, 1939

Rec. S. Aust. Mus. 6(3): 214, pl.20, fig. 29.
= *Acanthochitona druna* Ashby & Cotton, 1939.

Holotype: P4348, 1 incomplete median valve, from MacDonalds (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.
Note: Type unique.

Acanthochiton forsythensis Ashby & Cotton, 1939
Rec. S. Aust. Mus. 6(3): 213, pl. 20, fig. 27.
 = *Acanthochitona forsythensis* Ashby & Cotton, 1939.
 Holotype: P4345, 1 incomplete median valve, from Forsyths (Bank), Grange Burn, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.
 Paratype: P10156, 1 incomplete median valve, with same collection data as holotype.
 Note: The specimen from Clifton Bank recorded by Ashby & Cotton (1939) is missing, presumed lost.

Acanthochiton (Lirachiton) inexpectus Ashby & Cotton, 1939
Rec. S. Aust. Mus. 6 (3): 215, pl. 20, fig. 31.
 = *Notoplax (Bassethullia) inexpecta* (Ashby & Cotton, 1939).
 Holotype: P4350, 1 complete posterior valve, from MacDonalds (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.
 Note: Generic placement follows Gowlett-Holmes (1987). Type unique.

Acanthochiton pilsbryoides Ashby & Cotton, 1939
Rec. S. Aust. Mus. 6(3): 216, pl. 20, fig. 27.
 = *Acanthochitona pilsbryoides* Ashby & Cotton, 1939.
 Holotype: P4346, 1 complete median valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian-Bairnsdalian), collected by W. Greed, date of collection unknown.
 Note: Type unique.

Acanthochiton sabratus Ashby & Cotton, 1939
Rec. S. Aust. Mus. 6(3): 215, pl. 20, fig. 25.
 = *Acanthochitona sabrata* Ashby & Cotton, 1939.
 Holotype: P4344, 1 incomplete median valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian-Bairnsdalian), collected by W. Greed, date of collection unknown.
 Note: Originally labelled and registered as *Acanthochiton parus*, later corrected to *A. sabratus*. *A. parus* may have been the original manuscript name, but was never published. Type unique.

Acanthochiton singletoni Cotton & Godfrey, 1940
 'The Molluscs of South Australia Part II' p. 570, fig. 588.
 = *Acanthochitona singletoni* Cotton & Godfrey, 1940.
 Holotype: P4341, 1 complete median valve, from MacDonalds (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Note: This specimen was originally recorded as *Afossochiton cudmorei* Ashby, 1925 by Ashby & Cotton (1939), and incorrectly labelled 'holotype' on the plate caption. Type unique.

Acanthochiton trianguloides Ashby & Cotton, 1939
Rec. S. Aust. Mus. 6(3): 216, pl. 20, fig. 28.
 = *Acanthochitona trianguloides* Ashby & Cotton, 1939.
 Holotype: P4347, 1 incomplete median valve, from Forsyths (Bank), Grange Burn, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.
 Note: Type unique.

Genus *Afossochiton* Ashby, 1925

Afossochiton cudmorei Ashby, 1925
Proc. R. Soc. Vic. (NS) 37(2): 179, pl. 18, figs 6, 7.
 Paratypes: P10150, 1 incomplete median valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian-Bairnsdalian), collector and date of collection unknown. T846, 1 incomplete median valve, same collection data as P10150.
 Note: P10150 is registered as from Balcombe Bay, Vic. and labelled as from MacDonalds, Muddy Creek. However, as it is definitely Ashby's (1925) figured specimen 'No. 2, paratype' we regard both the register and the label as incorrect. T846 corresponds to Ashby's (1925) specimen 'No. 3, paratype'. Holotype in NMV (P13311).

Afossochiton (Telochiton) dendus Ashby & Cotton, 1939
Rec. S. Aust. Mus. 6(3): 211, pl. 20, fig. 24.
 = *Afossochiton dendus* Ashby & Cotton, 1939.
 Holotype: P4342, 1 incomplete anterior valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian-Bairnsdalian), collected by W. Greed, date of collection unknown.
 Note: Type unique.

Afossochiton (Telochiton) iscus Ashby & Cotton, 1939
Rec. S. Aust. Mus. 6(3): 212, pl. 19, fig. 20.
 = *Afossochiton iscus* Ashby & Cotton, 1939.
 Holotype: P4339, 1 complete posterior valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian-Bairnsdalian), collected by W. Greed, date of collection unknown.
 Note: Type unique.

Afossochiton (Telochiton) magnicostatus Ashby & Cotton, 1939
Rec. S. Aust. Mus. 6(3): 212, pl. 20, fig. 23.

= *Afossachiton magnicostatus* Ashby & Cotton, 1939.
Holotype: P4343, 1 incomplete median valve, from MacDonaldis (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.
Note: Type unique.

Afossachiton sulci Ashby & Cotton, 1939
Rec. S. Aust. Mus. 6(3): 210, pl. 20, fig. 21.
Holotype: P4340, 1 complete anterior valve, from MacDonaldis (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.
Note: Type unique.

Genus **Notoplax** H. Adams, 1861

Molachiton naxus Ashby & Cotton, 1939
= *Notoplax (Bassethullia) inexpecta* (Ashby & Cotton, 1939).
see LEPTOCHITONIDAE

Family **CHITONIDAE**

Genus **Anthochiton** Thiele, 1893

Anthochiton duodeni Ashby & Cotton, 1939
Rec. S. Aust. Mus. 6(3): 235, pl. 20, fig. 38.
= *Chiton (Rhyssoplax) duodeni* (Ashby & Cotton, 1939).
Holotype: P4357, 1 incomplete median valve, from MacDonaldis (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.
Note: Type unique.

Anthochiton macdonaldensis Ashby & Cotton, 1939
Rec. S. Aust. Mus. 6(3): 234, pl. 21, fig. 39.
= *Chiton (Rhyssoplax) macdonaldensis* (Ashby & Cotton, 1939).
Holotype: P4359, 1 complete posterior valve, from MacDonaldis (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.
Note: Type unique.

Anthochiton octocostatus Ashby & Cotton, 1939
Rec. S. Aust. Mus. 6(3): 235, pl. 21, fig. 40.
= *Chiton (Rhyssoplax) octocostatus* (Ashby & Cotton, 1939).
Holotype: P4360, 1 half median valve, from MacDonaldis (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.
Note: Type unique.

Genus **Chiton** Linnaeus, 1758

Chiton fossicus Ashby & Torr, 1901
Trans. R. Soc. S. Aust. 25(2): 140, pl. 4, fig. 4.
= *Chiton (Rhyssoplax) fossicus* Ashby & Torr, 1901.
Holotype: T840, 1 incomplete median valve, from Table Cape, Tas., Table Cape Group, early Miocene (Longfordian), collected by R. Tate and J. Dennant, date of collection unknown.
Note: Type unique.

Chiton paucipustulosus Ashby & Torr, 1901
Trans. R. Soc. S. Aust. 25(2): 141, pl. 4, fig. 2.
= *Loricella paucipustulosa* (Ashby & Torr, 1901) (SCHIZOCHITONIDAE).
Holotype: T839, 1 complete median valve, from Table Cape, Tas., Table Cape Group, early Miocene (Longfordian), collected by R. Tate and J. Dennant, date of collection unknown.
Note: A specimen of this species in the collection (P4366) is labelled 'Pleisiotype'. This specimen is Ashby and Cotton's (1939) 'Hypotype' and has no type status. Type unique.

Chiton (Anthochiton) tricostalis relata Ashby & Cotton, 1936
Rec. S. Aust. Mus. 5(4): 509, fig. 1.
= *Chiton (Rhyssoplax) tricostalis relatus* Ashby & Cotton, 1936.
Holotype: P10157 (ex D12883), 1 incomplete median valve, from 151 m depth, Torrensville Bore, Adelaide, S.A., Dry Creek Sands, late Pliocene (Yatalan), collected by W.J. Kimber, date of collection unknown.
Note: Type unique.

Family **CRYPTOPLACIDAE**

Genus **Cryptoplax** Blainville, 1818

Cryptoplax ludbrookae Ashby, 1940
Trans. R. Soc. S. Aust. 64(2): 266.
Holotype: P4285, 1 complete anterior valve, from 103–117 m depth, bore at Holden's Motor Body Works, Woodville, Adelaide, S.A., Dry Creek Sands, late Pliocene (Yatalan), collected by S.A. Department of Mines, 1934.
Note: Type unique.

Cryptoplax numicus Ashby & Cotton, 1939
Rec. S. Aust. Mus. 6(3): 219, pl. 19, fig. 18.
Holotype: P4337, 1 incomplete median valve, from MacDonaldis (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.
Note: Type unique.

MacDonalds (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown. Paratypes: P12829, 1 incomplete anterior valve and 1 incomplete median valve, with same collection data as holotype.

Note: The anterior valve in lot P12829 is Ashby & Cotton's (1939) 'Hypotype'.

Family ISCHNOCHITONIDAE

Genus *Callistochiton* Dall, 1882

Callistochiton greedi Ashby & Cotton, 1939

Rec. S. Aust. Mus. 6(3): 232, pl. 21, fig. 41.

Holotype: P4369, 1 half median valve, from Forsyths (Bank), Grange Burn, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Paratypes: P12823, 2 median valve fragments, with same collection data as holotype.

Note: Ashby and Cotton (1939) list 4 paratype fragments. The label of P12823 states '1 sent USA Dec 1938', so the 4th fragment is presumed lost before registration, as register only lists 2 specimens.

Callistochiton inexpectus Ashby & Cotton, 1939

Rec. S. Aust. Mus. 6(3): 233, pl. 21, figs 41, 42.

Holotype: P4372, 1 incomplete median valve, from MacDonalds (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Paratypes: P4373, 1 complete posterior valve, with same collection data as holotype. P12818, 1 incomplete median valve and 1 incomplete posterior valve, with same collection data as holotype.

Note: P4373 is Ashby and Cotton's (1939) 'Hypotype', labelled and registered as 'Pleisiotype'. All three lots originally labelled and registered as *Callistochiton affinis*, an unpublished name, and later corrected to *C. inexpectus*.

Callistochiton reticulatus Ashby & Cotton, 1939

Rec. S. Aust. Mus. 6(3): 233, pl. 21, figs 44, 45.

Holotype: P4370, 1 incomplete median valve, from MacDonalds (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Paratypes: P4371, 1 incomplete median valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian–Bairnsdalian), collected by W. Greed, date of collection unknown. P4381, 1 incomplete posterior valve, from Forsyths (Bank), Grange Burn, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

P12820, 2 half median valves and 1 incomplete posterior valve, with same collection data as P4381.

Note: Ashby & Cotton (1939) list a 'Hypotype' (P4383) from the same locality as the holotype, which could not be found in the collection, however, the register lists P4383 from Forsyths. P4381 is labelled 'Pleisiotype' (= 'Hypotype') but the locality on the label (Forsyths) differs from the locality in the register (MacDonalds). We believe the 2 specimens were confused before registration, that the 'Hypotype' specimen of Ashby & Cotton (1939) has been lost, and replaced by P4381, which is part of the lot of 4 specimens from Forsyths mentioned by Ashby & Cotton (1939), the remainder of the lot being P12820.

Genus *Callochiton* Gray, 1847

Callochiton macdonaldi Ashby & Cotton, 1939

Rec. S. Aust. Mus. 6(3): 227, pl. 21, fig. 46.

Holotype: P4368, 1 incomplete median valve, from MacDonalds (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Note: Type unique.

Callochiton (Ocellochiton) sulci Ashby, 1939

Proc. Linn. Soc. Lond. 151(3): 187, pl. 3, figs 1–3.

= *Ocellochiton sulci* (Ashby, 1939).

Holotype: P10158; 1 incomplete median valve, from Balcombe Bay, Mornington, Vic., Balcombe Clay, early to middle Miocene (Batesfordian–Bairnsdalian), collected by F.A. Cudmore, date of collection unknown.

Paratypes: P26776, 1 incomplete anterior valve and 1 incomplete posterior valve with same collection data as holotype.

Genus *Ischnochiton* Gray, 1847

Ischnochiton (Radsella) cliftonensis Ashby & Cotton, 1939

Rec. S. Aust. Mus. 6(3): 231, pl. 19, fig. 14.

= *Lavenachiton cliftonensis* (Ashby & Cotton, 1939) (INCERTAE SEDIS).

Holotype: P4333, 1 incomplete median valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian–Bairnsdalian), collected by W. Greed, date of collection unknown.

Note: Type unique.

Ischnochiton cossyrus Ashby & Cotton, 1939

Rec. S. Aust. Mus. 6(3): 229, pl. 20, fig. 37.

Holotype: P4356, 1 incomplete posterior valve, from MacDonalds (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Note: Type unique.

Ischnochiton durius Ashby & Cotton, 1939*Rec. S. Aust. Mus.* 6(3): 230, pl. 20, fig. 33.= *Ischnochiton cossyrus* Ashby & Cotton, 1939.

Holotype: P4352, 1 incomplete posterior valve, from MacDonaldis (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Note: Type unique.

Ischnochiton neglectus Ashby & Cotton, 1939*Rec. S. Aust. Mus.* 6(3): 231, pl. 20, fig. 34.

Holotype: P4353, 1 half median valve, from Forsyths (Bank), Grange Burn, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Paratypes: P12819, 2 fragments of median valves with same collection data as holotype.

Ischnochiton numantius Ashby & Cotton, 1939*Rec. S. Aust. Mus.* 6(3): 229, pl. 19, fig. 16.

Holotype: P4335, 1 incomplete posterior valve, from Forsyths (Bank), Grange Burn, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Note: Type unique.

Ischnochiton isurus Ashby & Cotton, 1939*Rec. S. Aust. Mus.* 6(3): 228, pl. 19, fig. 15, pl. 20, fig. 35.= *Ischnochiton vinazus* Ashby & Cotton, 1939.

Holotype: P4334, 1 half median valve, from MacDonaldis (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Paratypes: P12838, 1 fragment of a median valve, with same collection data as holotype. P26767, 1 half median valve, from Forsyths (Bank), Grange Burn, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Note: One paratype of this species, Ashby & Cotton's (1939) 'Hypotype' P4354, is now the holotype of *Ischnochiton varenae* Cotton & Godfrey, 1940.*Ischnochiton varenae* Cotton & Godfrey, 1940

'The Molluscs of South Australia Part II' p. 570, fig. 579.

Holotype: P4354, 1 incomplete posterior valve, from Forsyths (Bank), Grange Burn, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Note: This specimen was originally a paratype of *Ischnochiton isurus* Ashby & Cotton, 1939 [Ashby & Cotton's (1939) 'Hypotype']. Type unique.*Ischnochiton vinazus* Ashby & Cotton, 1939*Rec. S. Aust. Mus.* 6(3): 228, pl. 20, fig. 36.

Holotype: P4355, 1 half median valve, from

Macdonaldis (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Paratypes: P12828, 2 fragments of median valves with same collection data as holotype.

Genus *Ocellochiton* Ashby, 1939*Lorica oculea* Ashby & Cotton, 1939= *Ocellochiton sulci* (Ashby, 1939).

see SCHIZOCHITONIDAE

Lorica varena Ashby & Cotton, 1939= *Ocellochiton sulci* (Ashby, 1939).

see SCHIZOCHITONIDAE

Family LEPTOCHITONIDAE

Genus *Belchiton* Ashby & Cotton, 1939*Belchiton pulcherrimus* Ashby & Cotton, 1939*Rec. S. Aust. Mus.* 6(3): 221, pl. 19, fig. 10.= *Leptochiton pulcherrimus* (Ashby & Cotton, 1939).

Holotype: P4329, 1 incomplete median valve, from MacDonaldis (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Paratype: P12799, 1 incomplete median valve, with same collection data as holotype.

Genus *Lepidopleurus* Risso, 1826*Lepidopleurus habidus* Ashby & Cotton, 1939*Rec. S. Aust. Mus.* 6(3): 226, pl. 19, fig. 6.= *Leptochiton habidus* (Ashby & Cotton, 1939).

Holotype: P4325, 1 half median valve, from MacDonaldis (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Paratype: P12821, 2 median valve fragments, with same collection data as holotype.

Lepidopleurus badioides Ashby & Cotton, 1939*Rec. S. Aust. Mus.* 6(3): 222, pl. 19, fig. 4, pl. 21, fig. 47.= *Leptochiton badioides* (Ashby & Cotton, 1939).

Holotype: P4323, 1 incomplete posterior valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian - Bairnsdalian), collected by W. Greed, date of collection unknown.

Paratypes: P4358, 2 fragments of a median valve, from Forsyths (Bank), Grange Burn, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown. P12804, 2 fragments of a posterior valve, with same collection data as P4358. P12805, 1 incomplete

median valve, with same collection data as P4358.

Lepidopleurus cliffdenensis Ashby, 1929
Trans. N. Z. Inst. **60**: 367, pl. 32, figs 8a, 8b.
= *Leptochiton cliffdenensis* (Ashby, 1929).

Holotype: P10162, 1 fragment of a median valve, from Clifden, South Island, N.Z., Clifden Limestone, early Miocene (Hutchinsonian), collector and date of collection unknown.

Note: Type unique. Ashby (1929b) lists two fragments of the holotype, the second fragment is missing, presumed lost.

Lepidopleurus diversigranatus Ashby & Cotton, 1939

Rec. S. Aust. Mus. **6**(3): 227, pl. 19, figs 1, 9.
= *Leptochiton diversigranatus* (Ashby & Cotton, 1939).

Holotype: P4328, 1 incomplete posterior valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian-Bairnsdalian), collected by W. Greed, date of collection unknown.

Paratype: P4320, 1 incomplete median valve, with same collection data as holotype. Note: The paratype P4320 is Ashby & Cotton's (1939) 'Hypotype'.

Lepidopleurus magnogranifer Ashby, 1925
Proc. R. Soc. Vic. (NS) **37**(2): 171, pl. 18, fig. 1.
= *Leptochiton magnogranifer* (Ashby, 1925).

Holotype: T847, 1 incomplete median valve, from Muddy Creek, Hamilton, Vic., exact stratum not recorded, collected by J. Dennant and R. Tate, date of collection unknown.

Note: A label with the holotype lists the locality as Clifton Bank, (Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian-Bairnsdalian), which is the type locality defined by Ashby and Cotton (1939) with their 'Pleisiotype' (P4322), which is not a valid type. Type unique.

Lepidopleurus nivarus Ashby & Cotton, 1939
Rec. S. Aust. Mus. **6**(3): 222, pl. 19, fig. 5.
= *Leptochiton nivarus* (Ashby & Cotton, 1939).

Holotype: P4324, 1 incomplete median valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian-Bairnsdalian), collected by W. Greed, date of collection unknown.

Paratypes: P26744, 2 fragments of median valves, with same collection data as holotype.

Lepidopleurus pamphilius Ashby & Cotton, 1939
Rec. S. Aust. Mus. **6**(3): 222, pl. 19, fig. 2.
= *Protochiton granulatus* (Ashby & Torr, 1901) (PROTOCHITONIDAE)

Holotype: P4321, 2 fragments of a median valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy

Creek Marl, early to middle Miocene (Balcombian-Bairnsdalian), collected by W. Greed, date of collection unknown.

Note: Type unique.

Lepidopleurus relatus Ashby & Cotton, 1939

Rec. S. Aust. Mus. **6**(3): 224, pl. 19, fig. 12.
= *Leptochiton magnogranifer* (Ashby, 1925).

Holotype: P4331, 2 fragments of a median valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian-Bairnsdalian), collected by W. Greed, date of collection unknown.

Paratypes: P12807, 1 median valve fragment, with same collection data as holotype. P12808, 1 median valve fragment, with same collection data as holotype. Note: After examining both types, we agree with Cotton & Weeding (1941) and van Belle (1981) in synonymising this species with *L. magnogranifer* (Ashby, 1925). However, the types of the latter are much more worn than the types of *L. relatus*, not the reverse, as was stated by Cotton & Weeding (1941). The holotype was broken into two pieces subsequent to its description.

Lepidopleurus sephus Ashby & Cotton, 1939

Rec. S. Aust. Mus. **6**(3): 225, pl. 19, fig. 11.
= *Leptochiton sephus* (Ashby & Cotton, 1939).

Holotype: P4330, 1 incomplete median valve, from Forsyths (Bank), Grange Burn, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown. Note: Type unique.

Lepidopleurus sinervus Ashby & Cotton, 1939

Rec. S. Aust. Mus. **6**(3): 225, pl. 19, fig. 7.
= *Leptochiton sinervus* (Ashby & Cotton, 1939).

Holotype: P4326, 1 fragment of an anterior valve, from Forsyths (Bank), Grange Burn, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown. Paratype: P26743, 2 fragments of an anterior valve, with same collection data as holotype.

Lepidopleurus singus Ashby & Cotton, 1939

Rec. S. Aust. Mus. **6**(3): 226, pl. 19, fig. 8.
= *Leptochiton singus* (Ashby & Cotton, 1939).

Holotype: P4327, 1 complete posterior valve, from MacDonalds (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown. Note: Type unique.

? *Lepidopleurus uxellus* Ashby & Cotton, 1939

Rec. S. Aust. Mus. **6**(3): 223, pl. 19, fig. 13.
= *Leptochiton uxellus* (Ashby & Cotton, 1939).

Holotype: P4332, 1 incomplete posterior valve, from

Forsyths (Bank), Grange Burn, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown. Note: Type unique.

Genus **Molachiton** Ashby & Cotton, 1939

Molachiton naxus Ashby & Cotton, 1939
Rec. S. Aust. Mus. **6**(3): 220, pl. 20, fig. 32.
= *Notoplax (Bassethullia) inexpecta* (Ashby & Cotton, 1939) (ACANTHOCHITONIDAE)
Holotype: P4351, 1 half median valve, from MacDonalds (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown. Note: Generic placement follows Gowlett-Holmes (1987). Type unique.

Family **MOPALIIDAE**

Genus **Plaxiphora** Gray, 1847

Plaxiphora concentrica Ashby & Torr, 1901
Trans. R. Soc. S. Aust. **25**(2): 138, pl. 4, fig. 8.
= *Plaxiphora (P.) albida* (Blainville, 1825) (Recent species).
Holotype: T836, 1 complete posterior valve, from Gellibrand River, Vic., early Miocene, collector and date of collection unknown.
Note: We believe that this valve is from a recent specimen, and that the age and stratum are incorrect. We therefore regard it as a synonym of *P. (P.) albida*, an extant species. Type unique.

Plaxiphora gellibrandi Ashby & Torr, 1901
Trans. R. Soc. S. Aust. **25**(2): 139, pl. 4, fig. 1.
= *Plaxiphora (P.) albida* (Blainville, 1825) (Recent species).
Holotype: T837, 1 complete posterior valve, from Gellibrand, Vic., early Miocene, collector and date of collection unknown.
Note: The age and stratum are apparently in error as the valve is from a recent specimen. Type unique.

Family **PROTOCHITONIDAE**

Genus **Protochiton** Ashby, 1925

Acanthochites (Notoplax) granulosus Ashby & Torr, 1901
= *Protochiton granulosus* (Ashby & Torr, 1901).
see ACANTHOCHITONIDAE

Lepidopleurus pamphilius Ashby & Cotton, 1939
= *Protochiton granulosus* (Ashby & Torr, 1901).
see LEPTOCHITONIDAE

Family **SCHIZOCHITONIDAE**

Genus **Aulacochiton** Shuttleworth, 1853

Aulacochiton erma Cotton & Godfrey, 1940
'The Molluscs of South Australia Part II' p. 570, fig. 588.

= *Lorica compressa* Ashby & Torr, 1901.
Holotype: P4286, 1 incomplete median valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian-Bairnsdalian), collector and date of collection unknown.

Note: Van Belle (1981) considers *A. erma* to be a distinct species, but after comparing the holotypes of this species and *Lorica compressa*, we believe they are conspecific, and that the holotype of *A. erma* is a very weathered example of *L. compressa*. Type unique.

Genus **Lorica** H. & A. Adams, 1852

Lorica affinis Ashby & Torr, 1901
Trans. R. Soc. S. Aust. **25**(2): 137, pl. 4, fig. 7.
= *Lorica compressa* Ashby & Torr, 1901.
Holotype: T843, 1 incomplete median valve, from Table Cape, Tas., Table Cape Group, early Miocene (Longfordian), collected by R. Tate and J. Dennant, date of collection unknown.
Note: The locality and age were not given by Ashby & Torr (1901), but the type is clearly labelled 'Table Cape', which is the locality given for this species by Ashby (1925). Type unique.

Lorica compressa Ashby & Torr, 1901
Trans. R. Soc. S. Aust. **25**(2): 136, pl. 4, fig. 6.
Holotype: T842, 1 incomplete median valve, from Table Cape, Tas., Table Cape Group, early Miocene (Longfordian), collected by R. Tate and J. Dennant, date of collection unknown.
Note: The locality and age were not given by Ashby & Torr (1901), but the type is clearly labelled 'Table Cape', which is the locality given for this species by Ashby (1925). Type unique.

Lorica oculatea Ashby & Cotton, 1939
Rec. S. Aust. Mus. **6**(3): 237, pl. 21, fig. 48.
= *Ocellochiton sulci* (Ashby, 1939) (ISCHNOCHITONIDAE).

Holotype: P4362, 1 incomplete median valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian-Bairnsdalian), collected by W. Greed, date of collection unknown.
Paratype: P12817, 1 incomplete median valve with same collection data as holotype.

Lorica varena Ashby & Cotton, 1939
Rec. S. Aust. Mus. **6**(3): 238, pl. 21, fig. 49.

= *Ocellochiton sulci* (Ashby, 1939) (ISCHNOCHITONIDAE).

Holotype: P4361, 1 incomplete median valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian–Bairnsdalian), collected by W. Greed, date of collection unknown.

Note: Type unique.

Genus *Loricella* Pilsbry, 1893

Loricella concava Ashby & Cotton, 1939

Rec. S. Aust. Mus. 6(3): 236, pl. 21, fig. 51.

Holotype: P4367, 1 incomplete posterior valve, from MacDonalds (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Note: Type unique.

Loricella gigantea Ashby & Torr, 1901

Trans. R. Soc. S. Aust. 25(2): 137, pl. 4, fig. 3.

Holotype: T838, 1 incomplete anterior valve, from Schnapper Point, Mornington, Vic., Balcombe Clay, early to middle Miocene (Batesfordian–Bairnsdalian), collected by R. Tate and J. Dennant, date of collection unknown.

Note: Ashby (1925) states the above locality is in error for the Freestone Cove Sandstone ('Lower Beds'), Table Cape, Tas., early Miocene (Longfordian). See note on Schnapper Point in Stratigraphical Notes. Type unique.

Loricella magnopustulosa Ashby & Cotton, 1939

Rec. S. Aust. Mus. 6(3): 235, pl. 21, figs 50, 53.

Holotype: P4365, 1 incomplete anterior valve, from MacDonalds (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown. Paratype: P4364, 1 half median valve, same collection data as holotype.

Note: P4364 is Ashby & Cotton's (1939) 'Hypotype'. The two paratypes listed by Ashby & Cotton (1939) are missing, presumed lost.

Chiton paucipustulosa Ashby & Torr, 1901

= *Loricella paucipustulosa* (Ashby & Torr, 1901).

see CHITONIDAE

Genus *Oochiton* Ashby, 1929

Oochiton halli Ashby, 1929

Proc. R. Soc. Vic. (NS) 41(2): 222, pl. 24, figs 1a, b, 2, 3a-c, 8a, b.

Neotype: P4393, 1 complete anterior valve, from Clifton Bank, Muddy Creek, Hamilton, Vic., Muddy Creek Marl, early to middle Miocene (Balcombian–Bairnsdalian), collected by W. Greed, date of collection unknown.

Note: Neotype selected by Ashby & Cotton (1939) to replace type destroyed by fire in Ashby's house on March 9, 1934. This specimen was selected to replace 'holotype of the head valve of this species' according to Ashby & Cotton (1939), however the holotype was a median valve according to Ashby (1929a). As none of the types listed by Ashby (1929a) could be found, we believe that they were all destroyed by fire, and that the anterior valve listed above is a valid neotype.

INCERTAE SEDIS

Genus *Lavenachiton* Cotton & Godfrey, 1940

Ischnochiton (Radsietta) cliftonensis Ashby & Cotton, 1939

= *Lavenachiton cliftonensis* (Ashby & Cotton, 1939). see ISCHNOCHITONIDAE

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